Appl. No. 09/521,641
Amdt. dated Jan. 30, 2007
Reply to Office Action of Oct. 31, 2006

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of the Claims:

Claim 1 (currently amended): A method of performing additive synthesis of digital audio signals ~~in a recursive digital oscillator~~, comprising:

receiving digital audio signal frames in a digital oscillator wherein each digital audio signal frame includes a set of frequency, amplitude, and phase components represented as coefficients of variables in a mathematical expression, each digital audio signal frame thereby including a frequency coefficient representation, wherein said digital oscillator is a recursive digital oscillator generating frequency f lying in the range from zero to one-half of a sampling frequency f_s including recursion coefficients x_n given by $x_n = 2x_{n-1} - \epsilon x_{n-1} - x_{n-2}$, wherein $\epsilon = 2 - 2\cos(\omega)$ and wherein $\omega = 2\pi f/f_s$, and

forming converted frequency coefficients by Re-Mapping ~~of~~ bits of said frequency coefficient representation to bias audio reproduction accuracy toward low frequency signals

~~wherein said digital oscillator is an oscillator as in claim 16 A~~

~~and~~ wherein said Re-Mapping biases the generating frequency of said oscillator, whereby ε is represented by an unsigned mantissa, m, combined with an unsigned exponent, e, biased so that the actual represented value is $\varepsilon = 2^{2-e} m$,

~~as in claim 17~~; and

performing additive synthesis with said converted frequency coefficients, thereby synthesizing audio samples.

Claim 2 (previously presented): The method of claim 1 further comprising the step of defining said frequency coefficient representation with an exponent characterizing a floating-point range extension.

Claim 3 (previously presented): The method of claim 2 wherein said defining step includes the step of specifying said exponent to correspond to a right shift amount necessary to correct for precision limitations introduced by limiting Re-Mapping coefficients to 16 bits.

Claim 4 (previously presented): The method of claim 3 wherein said receiving, forming, and performing steps are implemented utilizing a 16-bit fixed point processor.

Claim 5 (previously presented): The method of claim 1 wherein said receiving, forming and performing steps are implemented utilizing a digital signal processor.

Claim 6 (previously presented): The method of claim 1 wherein said receiving, forming, and performing steps are implemented utilizing a field programmable gate array.

Claim 7 (previously presented): The method of claim 1 wherein said receiving, forming, and performing steps are implemented utilizing a Very Long Instruction Word processor.

Claim 8 (previously presented): The method of claim 1 wherein said receiving, forming, and performing steps are implemented utilizing a Reduced Instruction Set Computer.

Claim 9 (previously presented): The method of claim 1 wherein said receiving, forming, and performing steps are implemented utilizing a Residue Number System processor.

Claim 10 (currently amended): A computer readable ~~memory~~ medium encoded with computer executable instructions ~~to direct a processor to function in a specified manner,~~ comprising:

a first set of executable instructions to receive digital audio signal frames wherein each digital audio signal frame has a set of specified frequency values expressed as a bit sequence;

a second set of executable instructions to Re-Map said bit sequence to represent lower frequencies with more significant bits and higher frequencies with less significant bits; and

a third set of executable instructions to facilitate additive synthesis of said digital audio signal frames in a reduced-precision recursive digital oscillator

~~wherein said digital oscillator is an oscillator as in claim 16~~ , wherein said recursive digital oscillator generates frequency f lying in the range from zero to one-half of a sampling frequency f_s including recursion coefficients x_n given by $x_n = 2x_{n-1} - \epsilon x_{n-1} - x_{n-2}$, wherein $\epsilon = 2 - 2\cos(\omega)$ and wherein $\omega = 2\pi f/f_s$, and

and wherein said Re-Mapping biases the generating frequency of said oscillator ~~as in claim 17~~ , whereby ε is represented by an unsigned mantissa, m, combined with an

unsigned exponent, e, biased so that the actual represented value is $\varepsilon = 2^{2-e} m$.

Claim 11 (previously presented): The computer readable memory of claim 10 wherein said first set of executable instructions include instructions to identify a frequency coefficient representation of said specified frequency.

Claim 12 (previously presented): The computer readable memory of claim 11 further comprising a fourth set of executable instructions to define said frequency coefficient representation with an exponent characterizing a floating-point range extension.

Claim 13 (previously presented): The computer readable memory of claim 12 wherein said fourth set of executable instructions include instructions to specify said exponent to correspond to a right shift amount necessary to correct for precision limitations introduced by a reduced precision processor.

Claims 14-18 (canceled)